REMARKS

In an Office Action mailed September 8, 2003, the Examiner rejected claims 1-14. The title of the invention was objected to as not descriptive. Claim 9 was objected to as being unclear. The Examiner rejected claims 1-5 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the Applicant regards as the invention; claim 9 under 35 U.S.C. 102(e); claims 1 and 4-5 under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application Publication No. 2002/0047965 A1 to Suzuki et al. ("Suzuki") in view of U.S. Patent No. 5,847,791 to Hao ("Hao"); claims 2 and 3 under 35 U.S.C. 103(a) as being unpatentable over Suzuki in view Hao and further in view of U.S. Patent No. 6,097,464 to Liu ("Liu"); claims 1 and 4-5 under 35 U.S.C. 103(a) as being unpatentable over Japanese Patent No. JP-07-239471 to Osamu ("Osamu") in view of Hao; claims 6-7 and 10-14 under U.S. Patent No. 5,650,867 to Kojima ("Kojima") in view of U.S. Patent No. 6,424,397 to Kuo ("Kuo"); and claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kojima in view of Kuo and further in view of Hao.

Claims 1-14 are pending in this application, with claims 7 and 9 amended.

The title of the patent application has been amended to overcome the Examiners objection thereto.

Claim 7, a method claim, was amended to have it correctly depend from claim 6, a method claim, rather than claim 5, an apparatus claim.

Claim 9 has been amended to clarify its meaning.

Claims 1-5 were rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the Applicant regards as the invention. More specifically the Examiner stated that claim 1 "fails to interrelate essential elements of the invention as defined by Applicant in the specification." Further the Examiner stated: "There is no indication in the claim as to how the claimed elements spatially relate to one another. For example, Applicant has not identified how the substrates relate to each other with respect to the other elements claimed. While Applicant has broadly claimed that

certain elements are 'on' other elements, Applicant has not specifically pointed out and distinctly claimed the spatial arrangement of the various elements with respect to each other so that one of ordinary skill in the art would appreciated what is claimed." (See p. 3 of the Office Action.) This rejection is traversed and reconsideration is requested. The present invention relates to a liquid crystal display device. It is well know to those of ordinary skill in the art that these devices are made up of various layers resulting in a thin planar structure. Claim 1 claims such a layered device, so when one layer is described as on another layer, one of ordinary skill in the art understands this structural relationship.

The rejection of claim 9 is respectfully traversed and reconsideration is requested. Claim 9 is allowable over the cited reference in that this claim recites a combination of elements including, for example, "a cholesteric liquid crystal color filter on the absorption layer, the cholesteric liquid crystal color filter having a plurality of protrusions". Masazumi does no teach or suggest at least this feature of the claimed invention. Masazumi teaches a liquid crystal display were an ultraviolet-curing resin 9b' is first placed on the insulating film 7A. Then "droplets of liquid crystal materials 9a, 9a', and 9a" exhibiting cholesteric characteristic are applied or dropped to pixel positions . . ." Next a second base is arranged parallel to the first base and then the resin is hardened using ultraviolet light. The hardened resin forms cells surrounded the liquid crystal drops leaving a structure as shown in Fig. 1(C). The liquid crystal is still in a liquid state. A liquid sandwiched between to plate structures as shown in Fig. 1(C) cannot have protrusions. Nowhere does Masazumi teach a cholesteric liquid crystal color filter having a plurality of protrusions. Accordingly, Applicant respectfully submits that claim 9 is allowable Masazumi.

The rejection of claims 1 and 4-5 is respectfully traversed and reconsideration is requested. Claims 1 and 4-5 were rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki in view of Hao and also over Osamu in view of Hao. Claims 1 and 4-5 are allowable over the cited references in that each of these claims recites a combination of elements including, for example, "a cholesteric liquid crystal color filter on the absorption layer, the cholesteric liquid crystal color filter having a plurality of protrusions." None of the cited references including Suzuki, Osamu, and Hao, singly or in combination, teaches or suggests at least this feature of the claimed invention.

Suzuki is directed to a liquid crystal display using a cholesteric color filter. The examiner states that "Suzuki does not appear to have a cholesteric color filter with a plurality of protrusions." Suzuki solves the problem of a limited field of view that may result from the use of cholesteric color filters by using a scattering film on the outer surface of the display. The examiner looks to Hao to overcome the deficiency of Suzuki. The Examiner identifies light scattering particles in the color filter 202 as shown in Figure 4 of Hao as light scattering protrusions. The color filter is also shown in greater detail in Figure 3 of Hao, and no protrusions can be seen. The top and bottom of the filter are flat with no protrusions. Further, the color filter in Hao is manufactured using a pigment dispersion method where the pigment particles are dispersed in the color filter. (See col. 2, li. 66 - col. 3, li. 3.)

Neither Suzuki or Hao, singly or in combination, teach a cholesteric liquid crystal color filter on the absorption layer, the cholesteric liquid crystal color filter having a plurality of protrusions. Further, even if it is assumed that Hao does teach a cholesteric liquid crystal color filter having a plurality of protrusions (which the Applicant denies), Suzuki actually teaches away from this combination, by teaching a scattering film to solve the problem of limited field of view that may result from the use of cholesteric color filters. Accordingly, Applicant respectfully submits that claim 1 and claims 4-5, which depend from claim 1, are allowable over the cited references.

Osamu is directed to a liquid crystal display using a cholesteric color filter. The examiner states that "Osamu does not appear to have a cholesteric color filter with a plurality of protrusions." The examiner looks to Hao to overcome the deficiency of Suzuki. The Examiner identifies light scattering particles in the color filter 202 as shown in Figure 4 as light scattering protrusions. The color filter is also shown in greater detail in Figure 3 of Hao, and no protrusions can be seen. The top and bottom of the filter are flat with no protrusions. Further, the color filter in Hao is manufactured using a pigment dispersion method where the pigment particles are dispersed in the color filter. (See col. 2, li. 66 - col. 3, li. 3.)

Neither Osamu or Hao, singly or in combination, teach a cholesteric liquid crystal color filter on the absorption layer, the cholesteric liquid crystal color filter having a plurality of protrusions. Accordingly, Applicant respectfully submits that claim 1 and claims 4-5, which depend from claim 1, are allowable over the cited references.

The rejection of claims 2 and 3 is respectfully traversed and reconsideration is requested. Claims 2 and 3 were rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki or Osamu in view of Hao and further in view of Liu. Claims 2 and 3 are allowable over the cited references in that each of these claims recites a combination of elements including, for example, "a cholesteric liquid crystal color filter on the absorption layer, the cholesteric liquid crystal color filter having a plurality of protrusions." None of the cited references including Suzuki or Osamu, Hao, and Liu, singly or in combination, teaches or suggests at least this feature of the claimed invention. As discussed above, neither Suzuki or Osamu and Hao teach this element of the present invention.

Liu is directed to a multi-domain liquid crystal display that uses cruciform bump structures formed around the pixel electrodes to create multiple domains. These bumps are not part of a color filter. Therefore, Liu does not cure the deficiencies of Suzuki, Osamu, and Hao. Accordingly, Applicant respectfully submits that claims 2 and 3 are allowable over the cited references.

The rejection of claims 6-7 and 10-14 is respectfully traversed and reconsideration is requested. Claims 6-7 and 10-14 were rejected under 35 U.S.C. 103(a) as being unpatentable over Kojima in view of Kuo. Claims 6-7 are allowable over the cited references in that each of these claims recites a combination of elements including, for example, "forming a cholesteric liquid crystal color filter over the absorption layer, the cholesteric liquid crystal color filter having a plurality of protrusions." Claims 10-14 are allowable over the cited references in that each of these claims recites a combination of elements including, for example, "patterning the cholesteric liquid crystal layer using the photoresist as a mask to form a plurality of protrusions on the cholesteric liquid crystal layer." None of the cited references including Kojima and Kuo, singly or in combination, teaches or suggests at least this feature of the claimed invention.

Kojima is directed to forming a color filter. Specifically the color filter is formed using a photosensitive colored resign. (See col. 8, ll. 1-24.) Contrary to the Examiners assertion there is no cholesteric color filter. Rather the the ferroelectric liquid crystal used by Kojima may be able to produce cholesteric phase. This liquid crystal does not to act as a color filter, but rather is the liquid crystal used to pass or block light in the liquid crystal display. The Examiner

states the Kojima "does not appear to have the step of forming the cholesteric color filter such that it has a plurality of protrusions." Further, Kuo is cited to cure this defect.

Kuo is directed to a method of forming a wide-viewing angle liquid crystal display. The Examiner identifies second protrusion elements 418 as the protrusions in the cholesteric color filter as claimed. The second protrusion elements are not part of the color filter layer 416, but are formed separately over the color filter layer 416. Further the color filter layer is not a cholesteric filter layer. Therefore, the protrusions in Kuo are not protrusions on the cholesteric liquid crystal layer as recited in claims 6-7 and 10-14, and further neither Kuo nor Kojima teach a cholesteric color filter. Accordingly, Applicant respectfully submits that claims 6-7 and 10-14 are allowable over the cited references.

The rejection of claim 8 is respectfully traversed and reconsideration is requested. Claim 8 were rejected under 35 U.S.C. 103(a) as being unpatentable over Kojima in view of Kuo and further in view of Hao. Claim 8 are allowable over the cited references in that each of these claims recites a combination of elements including, for example, "forming a cholesteric liquid crystal color filter over the absorption layer, the cholesteric liquid crystal color filter having a plurality of protrusions." The deficiencies of Kojima and Kua are discussed above regarding lacking the above cited element. Further, Hao as also discussed above does not disclose this feature and does not therefore cure the deficiencies of Kojima and Kuo. Accordingly, Applicant respectfully submits that claim 8 is allowable over the cited references.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue.

If these papers are not considered timely filed by the Patent and Trademark Office, then a petition is hereby made under 37 C.F.R. §1.136, and any additional fees required under 37 C.F.R. § 1.136 for any necessary extension of time, or any other fees required to complete the filing of this response, may be charged to Deposit Account No. 50-0911. Please credit any overpayment to deposit Account No. 50-0911. A duplicate copy of this sheet is enclosed.

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Respectfully submitted,

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